

ABSTRACT OF THE DISCLOSURE

The invention provides for the translating two-dimensional microfabrication technology into the third dimension. Two-dimensional templates are fabricated using high-resolution molding processes. These templates are then bonded to form three-dimensional scaffold structures with closed lumens. These scaffolds can be formed by layering techniques, to interconnect flat template sheets to build up a full, vascularized organ. Alternatively, such scaffolds can be formed by rolling or folding the templates to form thick three-dimensional constructs.

The scaffolds can serve as the template for cell adhesion and growth by cells that are added to the scaffolds through the vessels, holes or pores. A second set of cells, such as endothelial cells, can also be added to or seeded onto the scaffold. The second set of seeded cells form small-dimensioned blood vessels between and through the first set of seeded cells. Once the sets of cells have been added to or seeded onto the three-dimensional scaffold, this tissue-engineered organ is implanted into a recipient.